

STS 115 Return Samples: Assessment of Air Quality aboard the Shuttle (STS-115) and International Space Station (12A)

The toxicological assessments of 2 grab sample canisters (GSCs), and 1 pair of formaldehyde badges from the Shuttle are reported in Table 1. Analytical methods have not changed from earlier reports. The recoveries of the 3 surrogates (¹³C-acetone, fluorobenzene, and chlorobenzene) from the 2 GSCs averaged 105, 110, and 108 %, respectively, and from 3 formaldehyde control badges the average recovery was 98 %. The Shuttle atmosphere was acceptable for human respiration.

Table 1. Analytical Summary of Shuttle Samples

Sample Location	Date of Sample	NMVOCs ¹ (mg/m ³)	T Value ² (units)	Alcohols (mg/m ³)	Formaldehyde (ug/m ³)
Middeck	9/16/06	5	0.20	2.9	--
Middeck	9/21/06	5	0.36	0.6	--
Flight-deck	9/18/06	--	--	--	34

¹ Non-methane volatile organic hydrocarbons.

² Calculated excluding CO₂ and formaldehyde.

The toxicological assessment of 4 GSCs from the ISS is shown in Table 2. The recoveries of the 3 standards from the GSCs averaged 109, 104 and 111%. Formaldehyde badges were not returned from the ISS.

Table 2. Analytical Summary of ISS Results

Module/Sample	Approx. Date	NMVOCs ¹ (mg/m ³)	T Value ² (units)	Alcohols (mg/m ³)	Formaldehyde (ug/m ³)
Lab/GSC/Formal.	7/28/06	11	1.09 ³	4.1	--
SM/CSC/Formal.	7/28/06	7	0.45	4.2	--
Lab/GSC/Formal.	8/29/06	6	0.36	3.5	--
SM/GSC/Formal.	8/29/06	8	0.85	3.7	--
<i>Guideline</i>		<25	<1.0	<5	<120

¹ Non-methane volatile organic hydrocarbons.

² Calculated excluding CO₂ and formaldehyde.

³ Primary components that increased the T value were siloxanes (0.50) and propenal (0.33).

The ISS atmosphere was found to be acceptable for human respiration. The alcohols were below the threshold established for protection of the water recovery system. Formaldehyde badges will be returned aboard the next Shuttle flight to ISS.

There was a report of an air quality issue during the attempted repair of the Elektron oxygen generator. At 2006/261:11:01 the secondary purification unit became extremely hot and generated smoke. Sometime later when a valve was opened the crew detected a “gasoline-like synthetic odor. Crew symptoms were not reported from this incident.

Enclosures

Table 1A: [Analytical concentrations of compounds found in the STS-115 GSCs](#)

Table 1B: [Analytical concentrations of compounds found in 12A GSCs](#)

Table 2A: [T-values of the compounds in table 1](#)

Table 2B: [T-values of the compounds in table 1B](#)

TABLE 1A
ANALYTICAL RESULTS OF
STS-115 CONTAINER AIR SAMPLES

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m ³)			
	AA04110 SN 1004 MIDDECK 9/16/06 @ 18:10 GMT	AA04111 SN1031 MIDDECK, AFT STBD 9/21/06 @ 05:07 GMT	AA04097 SN 1010 PREFLIGHT 9/8/06 @07:00 EDT	AA04098 SN 1081 PREFLIGHT 9/9/06 @05:25 EDT
TARGET COMPOUNDS (TO-14/POLAR)***				
FREON12	TRACE	TRACE	<0.05	<0.05
CHLOROMETHANE	TRACE	TRACE	TRACE	TRACE
FREON114	<0.05	<0.05	<0.05	<0.05
METHANOL	0.25	0.084	TRACE	TRACE
ACETALDEHYDE	0.11	0.13	TRACE	TRACE
VINYLCHLORIDE	<0.05	<0.05	<0.05	<0.05
BROMOMETHANE	<0.05	<0.05	<0.05	<0.05
ETHANOL*	2.2	0.37	TRACE	TRACE
CHLOROETHANE	<0.05	<0.05	<0.05	<0.05
ACETONITRILE	TRACE	TRACE	TRACE	TRACE
PROPENAL	<0.02	<0.02	<0.02	<0.02
ACETONE	0.35	0.13	TRACE	TRACE
PROPANAL	TRACE	TRACE	TRACE	TRACE
ISOPROPANOL	0.10	TRACE	0.35	0.32
FREON11	<0.05	<0.05	<0.05	<0.05
FURAN	<0.05	<0.05	<0.05	<0.05
ACRYLONITRILE	TRACE	<0.05	<0.05	<0.05
PENTANE	<0.05	<0.05	<0.05	<0.05
2-METHYL-2-PROPANOL	TRACE	TRACE	<0.05	<0.05
METHYLACETATE	TRACE	<0.05	<0.05	<0.05
1,1-DICHLOROETHENE	<0.05	<0.05	<0.05	<0.05
DICHLOROMETHANE	TRACE	TRACE	<0.05	<0.05
3-CHLOROPROPENE	<0.05	<0.05	<0.05	<0.05
FREON113	<0.05	<0.05	<0.05	<0.05
N-PROPANOL	TRACE	<0.05	<0.05	<0.05
1,1-DICHLOROETHANE	<0.05	<0.05	<0.05	<0.05
BUTANAL	<0.05	<0.05	<0.05	TRACE
2-BUTANONE	TRACE	<0.05	<0.05	TRACE
CIS-1,2-DICHLOROETHENE	<0.05	<0.05	<0.05	<0.05
2-METHYLFURAN	<0.05	<0.05	<0.05	<0.05
ETHYLACETATE	TRACE	<0.05	<0.05	<0.05
HEXANE	<0.05	<0.05	<0.05	<0.05
CHLOROFORM	<0.05	<0.05	<0.05	<0.05
2-BUTENAL	<0.05	<0.05	<0.05	<0.05
1,2-DICHLOROETHANE	TRACE	<0.05	<0.05	<0.05
1,1,1-TRICHLOROETHANE	<0.05	<0.05	<0.05	<0.05
N-BUTANOL	TRACE	<0.05	<0.05	<0.05
BENZENE	<0.05	<0.05	<0.05	<0.05
CARBONTETRACHLORIDE	<0.05	<0.05	<0.05	<0.05
2-PENTANONE	<0.05	<0.05	<0.05	<0.05
2-METHYLHEXANE	<0.05	<0.05	<0.05	<0.05
2,3-DIMETHYL PENTANE	<0.05	<0.05	<0.05	<0.05
PENTANAL	<0.05	<0.05	<0.05	<0.05
3-METHYLHEXANE	<0.05	<0.05	<0.05	<0.05
1,2-DICHLOROPROPANE	<0.05	<0.05	<0.05	<0.05
1,4-DIOXANE	<0.05	<0.05	<0.05	<0.05
TRICHLOROETHENE	<0.05	<0.05	<0.05	<0.05
2,5-DIMETHYL FURAN	<0.05	<0.05	<0.05	<0.05
N-HEPTANE	<0.05	<0.05	<0.05	<0.05
4-METHYL2-PENTANONE	<0.05	<0.05	<0.05	<0.05
CIS-1,3-DICHLOROPROPENE	<0.05	<0.05	<0.05	<0.05
2-PENTENAL	<0.05	<0.05	<0.05	<0.05

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)			
	AA04110 SN 1004 MIDDECK 9/16/06 @ 18:10 GMT	AA04111 SN1031 MIDDECK, AFT STBD 9/21/06 @ 05:07 GMT	AA04097 SN 1010 PREFLIGHT 9/8/06 @07:00 EDT	AA04098 SN 1081 PREFLIGHT 9/9/06 @05:25 EDT
TRANS-1,3-DICHLOROPROPENE	<0.05	<0.05	<0.05	<0.05
1,1,2-TRICHLOROETHANE	<0.05	<0.05	<0.05	<0.05
TOLUENE	TRACE	<0.05	<0.05	<0.05
HEXANAL	<0.05	<0.05	<0.05	<0.05
MESITYLOXIDE	<0.05	<0.05	<0.05	<0.05
1,2-DIBROMOETHANE	<0.05	<0.05	<0.05	<0.05
BUTYLACETATE	<0.05	<0.05	<0.05	<0.05
TETRACHLOROETHENE	<0.05	<0.05	<0.05	<0.05
CHLOROBENZENE	<0.05	<0.05	<0.05	<0.05
ETHYLBENZENE	<0.05	<0.05	<0.05	<0.05
M/P-XYLENES	<0.05	<0.05	<0.05	<0.05
2-HEPTANONE	<0.05	<0.05	<0.05	<0.05
CYCLOHEXANONE	TRACE	<0.05	<0.05	<0.05
HEPTANAL	<0.05	<0.05	<0.05	<0.05
STYRENE	<0.05	<0.05	<0.05	<0.05
1,1,2,2-TETRACHLOROETHANE	<0.05	<0.05	<0.05	<0.05
O-XYLENE	TRACE	<0.05	<0.05	<0.05
1,3,5-TRIMETHYLBENZENE	<0.05	<0.05	<0.05	<0.05
1,2,4-TRIMETHYLBENZENE	<0.05	<0.05	<0.05	<0.05
1,3-DICHLOROBENZENE	<0.05	<0.05	<0.05	<0.05
1,4-DICHLOROBENZENE	<0.05	<0.05	<0.05	<0.05
1,2-DICHLOROBENZENE	<0.05	<0.05	<0.05	<0.05
1,2,4-TRICHLOROBENZENE	<0.05	<0.05	<0.05	<0.05
HEXAChLORO-1,3-BUTADIENE	<0.05	<0.05	<0.05	<0.05

TARGET COMPOUNDS (TOXIC)				
1,3-BUTADIENE	<0.05	<0.05	<0.05	<0.05
ETHYLENE OXIDE	<0.05	<0.05	<0.05	<0.05
CARBON DISULFIDE	TRACE	TRACE	<0.05	TRACE
2-METHYL-2-PROPENAL	TRACE	<0.05	<0.05	TRACE
3-BUTEN-2-ONE	TRACE	TRACE	TRACE	TRACE
2-ETHOXYETHANOL	<0.05	<0.05	<0.05	<0.05
DIMETHYLDISULFIDE	<0.05	<0.05	<0.05	<0.05
OCTAMETHYLCYCLOTETRASILOXANE	0.096	0.15	0.86	TRACE

NON-TARGET COMPOUNDS				
BROMOTRIFLUOROMETHANE	0.19	1.4	TRACE	TRACE
HEXAMETHYLCYCLOTETRASILOXANE	0.26	0.66	3.0	0.16
LIMONENE	0.059	TRACE	TRACE	TRACE
DECAMETHYLCYCLOPENTASILOXANE	0.92	1.6	TRACE	TRACE

TOTAL ALCOHOLS PLUS ACETONE	2.9	0.62	0.42	0.40
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TARGET COMPOUNDS (GC)***				
CARBON MONOXIDE	<0.57	1.7	<0.57	<0.57
METHANE	13	100	<1.4	<1.4
HYDROGEN	6.1	17	<0.74	<0.74
CARBON DIOXIDE	10000	3200	950	TRACE

TOTAL CONCENTRATION (NON-METHANE HYDROCARBONS)	5.0	4.7	4.4	0.89
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< : Value is less than the laboratory report detection limit.

TRACE: Amount detected is sufficient for compound identification only.

***Measurements are calibrated by multi-point initial calibration and verified by mid-point continuing calibration.

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m3)			
	AA04110 SN 1004 MIDDECK 9/16/06 @ 18:10 GMT	AA04111 SN1031 MIDDECK, AFT STBD 9/21/06 @ 05:07 GMT	AA04097 SN 1010 PREFLIGHT 9/8/06 @07:00 EDT	AA04098 SN 1081 PREFLIGHT 9/9/06 @05:25 EDT
* Data from GC/FID run in bold				

CONTAMINANT TRACE COUNT	19	10	11	16
PROPENAL TRACE COUNT	0	0	0	0

ADD 0.01 TO CORRECTED TOTAL CONCENTRATION IF PROPENAL IS TRACE
 ADD .025 TO CORRECTED TOTAL CONCENTRATION FOR EACH COMPOUND THAT IS TRACG

CORRECTED TOTAL CONCENTRATION	4.98	4.72	4.45	0.89
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QA check total alcohols **2.9284** **0.6171** **0.4232** **0.3991**

ADD 0.025 TO CORRECTED TOTAL ALCOHOL FOR EACH ALCOHOL THAT IS TRACE

ALCOHOL TRACE COUNT	2	1	3	3
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TABLE 1B
ANALYTICAL RESULTS OF
12A RETURN CONTAINER AIR SAMPLES

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m ³)			
	AA04115 LAB S/N 1074 07/28/06 @ 09:55 GMT	AA04113 SM S/N 1050 07/28/06 @ 10:00 GMT	AA04114 LAB S/N 1071 08/29/06 @ 09:35 GMT	AA04112 SM S/N 1040 08/29/06 @ 09:40 GMT
TARGET COMPOUNDS (TO-14/POLAR)***				
FREON12	TRACE	TRACE	TRACE	TRACE
CHLOROMETHANE	TRACE	TRACE	TRACE	TRACE
FREON114	<0.05	<0.05	<0.05	<0.05
METHANOL	0.48	0.37	0.34	0.30
ACETALDEHYDE	0.14	0.087	0.12	0.14
VINYLCHLORIDE	<0.05	<0.05	<0.05	<0.05
BROMOMETHANE	<0.05	<0.05	<0.05	<0.05
ETHANOL+	3.0	3.3	2.4	2.8
CHLOROETHANE	<0.05	<0.05	<0.05	<0.05
ACETONITRILE	TRACE	TRACE	TRACE	TRACE
PROPENAL	TRACE	<0.02	<0.02	TRACE
ACETONE	0.31	0.27	0.24	0.30
PROPANAL	TRACE	TRACE	TRACE	TRACE
ISOPROPANOL	0.17	0.11	0.30	0.16
FREON11	TRACE	TRACE	<0.05	TRACE
FURAN	<0.05	<0.05	<0.05	<0.05
ACRYLONITRILE	TRACE	TRACE	TRACE	TRACE
PENTANE	<0.05	<0.05	<0.05	<0.05
2-METHYL-2-PROPANOL	TRACE	TRACE	TRACE	TRACE
METHYLACETATE	TRACE	TRACE	TRACE	TRACE
1,1-DICHLOROETHENE	<0.05	<0.05	<0.05	<0.05
DICHLOROMETHANE	TRACE	TRACE	TRACE	TRACE
3-CHLOROPROPENE	<0.05	<0.05	<0.05	<0.05
FREON113	<0.05	<0.05	<0.05	<0.05
N-PROPANOL	TRACE	TRACE	0.087	TRACE
1,1-DICHLOROETHANE	<0.05	<0.05	<0.05	<0.05
BUTANAL	TRACE	TRACE	TRACE	TRACE
2-BUTANONE	TRACE	TRACE	TRACE	TRACE
CIS-1,2-DICHLOROETHENE	<0.05	<0.05	<0.05	<0.05
2-METHYLFURAN	<0.05	<0.05	<0.05	<0.05
ETHYLACETATE	TRACE	TRACE	TRACE	TRACE
HEXANE	<0.05	<0.05	<0.05	<0.05
CHLOROFORM	<0.05	<0.05	<0.05	<0.05
2-BUTENAL	<0.05	<0.05	<0.05	<0.05
1,2-DICHLOROETHANE	TRACE	TRACE	TRACE	TRACE
1,1,1-TRICHLOROETHANE	<0.05	<0.05	<0.05	<0.05
N-BUTANOL	0.10	0.070	0.091	0.082
BENZENE	<0.05	<0.05	<0.05	<0.05
CARBONTETRACHLORIDE	<0.05	<0.05	<0.05	<0.05
2-PENTANONE	TRACE	<0.05	<0.05	TRACE
2-METHYLHEXANE	<0.05	<0.05	<0.05	<0.05
2,3-DIMETHYLPENTANE	<0.05	<0.05	<0.05	<0.05
PENTANAL	<0.05	<0.05	<0.05	TRACE
3-METHYLHEXANE	TRACE	TRACE	<0.05	TRACE
1,2-DICHLOROPROPANE	<0.05	<0.05	<0.05	<0.05
1,4-DIOXANE	<0.05	<0.05	<0.05	<0.05
TRICHLOROETHENE	<0.05	<0.05	<0.05	<0.05
2,5-DIMETHYLFURAN	<0.05	<0.05	<0.05	<0.05
N-HEPTANE	<0.05	<0.05	0.072	<0.05
4-METHYL2-PENTANONE	<0.05	<0.05	<0.05	<0.05
CIS-1,3-DICHLOROPROPENE	<0.05	<0.05	<0.05	<0.05
2-PENTENAL	<0.05	<0.05	<0.05	<0.05
TRANS-1,3-DICHLOROPROPENE	<0.05	<0.05	<0.05	<0.05
1,1,2-TRICHLOROETHANE	<0.05	<0.05	<0.05	<0.05
TOLUENE	TRACE	TRACE	TRACE	TRACE
HEXANAL	TRACE	<0.05	TRACE	TRACE

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m ³)			
	AA04115 LAB S/N 1074 07/28/06 @ 09:55 GMT	AA04113 SM S/N 1050 07/28/06 @ 10:00 GMT	AA04114 LAB S/N 1071 08/29/06 @ 09:35 GMT	AA04112 SM S/N 1040 08/29/06 @ 09:40 GMT
	<0.05	<0.05	<0.05	<0.05
MESITYLOXIDE	<0.05	<0.05	<0.05	<0.05
1,2-DIBROMOETHANE	<0.05	<0.05	<0.05	<0.05
BUTYLACETATE	TRACE	TRACE	TRACE	TRACE
TETRACHLOROETHENE	<0.05	<0.05	<0.05	<0.05
CHLOROBENZENE	<0.05	<0.05	<0.05	<0.05
ETHYLBENZENE	<0.05	<0.05	<0.05	<0.05
M/P-XYLENES	TRACE	TRACE	TRACE	TRACE
2-HEPTANONE	<0.05	<0.05	<0.05	<0.05
CYCLOHEXANONE	TRACE	TRACE	TRACE	TRACE
HEPTANAL	TRACE	<0.05	<0.05	<0.05
STYRENE	<0.05	<0.05	<0.05	<0.05
1,1,2,2-TETRACHLOROETHANE	<0.05	<0.05	<0.05	<0.05
O-XYLENE	TRACE	TRACE	TRACE	TRACE
1,3,5-TRIMETHYLBENZENE	<0.05	<0.05	<0.05	<0.05
1,2,4-TRIMETHYLBENZENE	<0.05	<0.05	<0.05	<0.05
1,3-DICHLOROBENZENE	<0.05	<0.05	<0.05	<0.05
1,4-DICHLOROBENZENE	<0.05	<0.05	<0.05	<0.05
1,2-DICHLOROBENZENE	<0.05	<0.05	<0.05	<0.05
1,2,4-TRICHLOROBENZENE	<0.05	<0.05	<0.05	<0.05
HEXAChLORO-1,3-BUTADIENE	<0.05	<0.05	<0.05	<0.05

TARGET COMPOUNDS (TOXIC)				
1,3-BUTADIENE	<0.05	<0.05	<0.05	<0.05
ETHYLENE OXIDE	<0.05	<0.05	<0.05	<0.05
CARBON DISULFIDE	TRACE	TRACE	TRACE	TRACE
2-METHYL-2-PROPENAL	TRACE	TRACE	TRACE	TRACE
3-BUTEN-2-ONE	TRACE	TRACE	TRACE	TRACE
2-ETHOXYETHANOL	<0.05	<0.05	<0.05	<0.05
DIMETHYLDISULFIDE	<0.05	<0.05	<0.05	<0.05
OCTAMETHYLCYCLOTETRAcSILOXANE	2.9	0.75	0.31	0.74

NON-TARGET COMPOUNDS				
OCTAFLUOROPROPANE	0.087	0.076	0.086	0.070
BROMOTRIFLUOROMETHANE	TRACE	TRACE	TRACE	TRACE
TRIMETHYLSILANOL	0.14	0.087	0.29	0.12
HEXAMETHYLCYCLOTRISILOXANE	1.9	1.3	0.58	1.6
LIMONENE	0.23	0.20	0.20	0.25
DECAMETHYLCYCLOPENTASILOXANE	0.47	0.17	0.44	0.51

TOTAL ALCOHOLS PLUS ACETONE	4.1	4.2	3.5	3.7

TARGET COMPOUNDS (GC)***				
CARBON MONOXIDE	<0.57	<0.57	<0.57	<0.57
METHANE	7.4	7.4	TRACE	TRACE
HYDROGEN	6.3	6.4	5.7	6.4
CARBON DIOXIDE	9400	9500	6600	7400

TOTAL CONCENTRATION (NON-METHANE HYDROCARBONS)	11	7.4	6.1	7.8

+ FROM GC/FID

< : Value is less than the laboratory report detection limit.

TRACE: Amount detected is sufficient for compound identification only. Calculations are based on one-half of the laboratory

report detection limit (1.1 mg/m³ for CO; 0.2 mg/m³ for CH₄; 1.6 mg/m³ for H₂; 0.05 mg/m³ for VOCs; and 0.02 mg/m³ for propenal.)

***Measurements are calibrated by multi-point initial calibration and verified by mid-point continuing calibration.

CHEMICAL CONTAMINANT	CONCENTRATION (mg/m ³)			
	AA04115 LAB S/N 1074 07/28/06 @ 09:55 GMT	AA04113 SM S/N 1050 07/28/06 @ 10:00 GMT	AA04114 LAB S/N 1071 08/29/06 @ 09:35 GMT	AA04112 SM S/N 1040 08/29/06 @ 09:40 GMT
CONTAMINANT TRACE COUNT	27	24	22	27
PROPENAL TRACE COUNT	1	0	0	1
				ADD 0.01 TO CORRECTED TOTAL CONCENTRATION IF PROPENAL IS TRACE
				ADD .025 TO CORRECTED TOTAL CONCENTRATION FOR EACH COMPOUND THAT IS TRACE
CORRECTED TOTAL CONCENTRATION	10.66	7.42	6.15	7.81
QA check total alcohols	4.1294	4.1802	3.4876	3.6675
				ADD 0.025 TO CORRECTED TOTAL ALCOHOL FOR EACH ALCOHOL THAT IS TRACE
ALCOHOL TRACE COUNT	1	1	0	1

TABLE 2A
ANALYTICAL RESULTS OF
STS-115 CONTAINER AIR SAMPLES

CHEMICAL CONTAMINANT	T-VALUE (7-d SMAC)			
	AA04110 SN 1004 MIDDECK 9/16/06 @ 18:10 GMT	AA04111 SN1031 MIDDECK, AFT STBD 9/21/06 @ 05:07 GMT	AA04097 SN 1010 PREFLIGHT 9/8/06 @07:00 EDT	AA04098 SN 1081 PREFLIGHT 9/9/06 @05:25 EDT
TARGET COMPOUNDS (TO-14/POLAR)***				
FREON12	0.00005	0.00005	ND	ND
CHLOROMETHANE	0.00061	0.00061	0.00061	0.00061
FREON114	ND	ND	ND	ND
METHANOL	0.02791	0.00933	0.00278	0.00278
ACETALDEHYDE	0.02659	0.03279	0.00625	0.00625
VINYLCHLORIDE	ND	ND	ND	ND
BROMOMETHANE	ND	ND	ND	ND
ETHANOL	0.00109	0.00019	0.00001	0.00001
CHLOROETHANE	ND	ND	ND	ND
ACETONITRILE	0.00373	0.00373	0.00373	0.00373
PROPENAL	ND	ND	ND	ND
ACETONE	0.00671	0.00256	0.00048	0.00048
PROPANAL	0.00175	0.00175	0.00175	0.00175
ISOPROPANOL	0.00070	0.00017	0.00232	0.00216
FREON11	ND	ND	ND	ND
FURAN	ND	ND	ND	ND
ACRYLONITRILE	0.00893	ND	ND	ND
PENTANE	ND	ND	ND	ND
2-METHYL-2-PROPANOL	0.00017	0.00017	ND	ND
METHYLACETATE	0.00021	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND
DICHLOROMETHANE	0.00050	0.00050	ND	ND
3-CHLOROPROPENE	ND	ND	ND	ND
FREON113	ND	ND	ND	ND
N-PROPANOL	0.00026	ND	ND	ND
1,1-DICHLOROETHANE	ND	ND	ND	ND
BUTANAL	ND	ND	ND	0.00141
2-BUTANONE	0.00083	ND	ND	0.00083
CIS-1,2-DICHLOROETHENE	ND	ND	ND	ND
2-METHYLFURAN	ND	ND	ND	ND
ETHYLACETATE	0.00014	ND	ND	ND
HEXANE	ND	ND	ND	ND
CHLOROFORM	ND	ND	ND	ND
2-BUTENAL	ND	ND	ND	ND
1,2-DICHLOROETHANE	0.01250	ND	ND	ND
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND
N-BUTANOL	0.00031	ND	ND	ND
BENZENE	ND	ND	ND	ND
CARBONTETRACHLORIDE	ND	ND	ND	ND
2-PENTANONE	ND	ND	ND	ND
2-METHYLHEXANE	ND	ND	ND	ND
2,3-DIMETHYL PENTANE	ND	ND	ND	ND
PENTANAL	ND	ND	ND	ND
3-METHYLHEXANE	ND	ND	ND	ND
1,2-DICHLOROPROPANE	ND	ND	ND	ND
1,4-DIOXANE	ND	ND	ND	ND
TRICHLOROETHENE	ND	ND	ND	ND
2,5-DIMETHYLFURAN	ND	ND	ND	ND
N-HEPTANE	ND	ND	ND	ND
4-METHYL2-PENTANONE	ND	ND	ND	ND
CIS-1,3-DICHLOROPROPENE	ND	ND	ND	ND
2-PENTENAL	ND	ND	ND	ND

CHEMICAL CONTAMINANT	T-VALUE (7-d SMAC)			
	AA04110 SN 1004 MIDDECK 9/16/06 @ 18:10 GMT	AA04111 SN1031 MIDDECK, AFT STBD 9/21/06 @ 05:07 GMT	AA04097 SN 1010 PREFLIGHT 9/8/06 @07:00 EDT	AA04098 SN 1081 PREFLIGHT 9/9/06 @05:25 EDT
TARGET COMPOUNDS (TO-14/POLAR)***				
TRANS-1,3-DICHLOROPROPENE	ND	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND
TOLUENE	0.00042	ND	ND	ND
HEXANAL	ND	ND	ND	ND
MESITYLOXIDE	ND	ND	ND	ND
1,2-DIBROMOETHANE	ND	ND	ND	ND
BUTYLACETATE	ND	ND	ND	ND
TETRACHLOROETHENE	ND	ND	ND	ND
CHLOROBENZENE	ND	ND	ND	ND
ETHYLBENZENE	ND	ND	ND	ND
M/P-XYLENES	ND	ND	ND	ND
2-HEPTANONE	ND	ND	ND	ND
CYCLOHEXANONE	0.00042	ND	ND	ND
HEPTANAL	ND	ND	ND	ND
STYRENE	ND	ND	ND	ND
1,1,2,2-TETRACHLOROETHANE	ND	ND	ND	ND
O-XYLENE	0.00011	ND	ND	ND
1,3,5-TRIMETHYLBENZENE	ND	ND	ND	ND
1,2,4-TRIMETHYLBENZENE	ND	ND	ND	ND
1,3-DICHLOROBENZENE	ND	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	ND
1,2-DICHLOROBENZENE	ND	ND	ND	ND
1,2,4-TRICHLOROBENZENE	ND	ND	ND	ND
HEXACHLORO-1,3-BUTADIENE	ND	ND	ND	ND
TARGET COMPOUNDS (TOXIC)				
1,3-BUTADIENE	ND	ND	ND	ND
ETHYLENE OXIDE	ND	ND	ND	ND
CARBON DISULFIDE	0.00156	0.00156	ND	0.00156
2-METHYL-2-PROPENAL	0.01471	ND	ND	0.01471
3-BUTEN-2-ONE	0.05814	0.05814	0.05814	0.05814
2-ETHOXYETHANOL	ND	ND	ND	ND
DIMETHYLDISULFIDE	ND	ND	ND	ND
OCTAMETHYLCYCLOTETRASILOXANE	0.00034	0.00055	0.00307	0.00009
NON-TARGET COMPOUNDS				
BROMOTRIFLUOROMETHANE	0.00002	0.00013	0.00000	0.00000
HEXAMETHYLCYCLOTRISILOXANE	0.00287	0.00739	0.03293	0.00183
LIMONENE	0.00010	0.00004	0.00004	0.00004
DECAMETHYLCYCLOPENTASILOXANE	0.00614	0.01035	0.00017	0.00017
TARGET COMPOUNDS (GC)***				
CARBON MONOXIDE	0.00000	0.14986	0.00000	0.00000
METHANE	0.00349	0.02623	0.00000	0.00000
HYDROGEN	0.01804	0.04856	0.00000	0.00000
CARBON DIOXIDE	0.78357	0.24363	0.07294	0.01538
TOTAL T-VALUE	0.98290	0.59829	0.18523	0.11193

ND : Value is less than the laboratory report detection limit.

Note: Number of decimal places in T-Values do not represent significant figures of measurements.

***Measurements are calibrated by multi-point initial calibration and verified by mid-point continuing calibration.

TABLE 2B
ANALYTICAL RESULTS OF
12A RETURN CONTAINER AIR SAMPLES

CHEMICAL CONTAMINANT	T-VALUE (180-d SMAC)			
	AA04115 LAB S/N 1074 07/28/06 @ 09:55 GMT	AA04113 SM S/N 1050 07/28/06 @ 10:00 GMT	AA04114 LAB S/N 1071 08/29/06 @ 09:35 GMT	AA04112 SM S/N 1040 08/29/06 @ 09:40 GMT
TARGET COMPOUNDS (TO-14/POLAR)***				
FREON12	0.00005	0.00005	0.00005	0.00005
CHLOROMETHANE	0.00061	0.00061	0.00061	0.00061
FREON114	ND	ND	ND	ND
METHANOL	0.05334	0.04063	0.03779	0.03378
ACETALDEHYDE	0.03517	0.02174	0.02928	0.03613
VINYLCHLORIDE	ND	ND	ND	ND
BROMOMETHANE	ND	ND	ND	ND
ETHANOL	0.00152	0.00167	0.00122	0.00140
CHLOROETHANE	ND	ND	ND	ND
ACETONITRILE	0.00373	0.00373	0.00373	0.00373
PROPENAL	0.33333	ND	ND	0.33333
ACETONE	0.00597	0.00524	0.00459	0.00572
PROPANAL	0.00694	0.00694	0.00694	0.00694
ISOPROPANOL	0.00114	0.00072	0.00198	0.00104
FREON11	0.00003	0.00003	ND	0.00003
FURAN	ND	ND	ND	ND
ACRYLONITRILE	0.00893	0.00893	0.00893	0.00893
PENTANE	ND	ND	ND	ND
2-METHYL-2-PROPANOL	0.00021	0.00021	0.00021	0.00021
METHYLACETATE	0.00021	0.00021	0.00021	0.00021
1,1-DICHLOROETHENE	ND	ND	ND	ND
DICHLOROMETHANE	0.00250	0.00250	0.00250	0.00250
3-CHLOROPROPENE	ND	ND	ND	ND
FREON113	ND	ND	ND	ND
N-PROPANOL	0.00026	0.00026	0.00088	0.00026
1,1-DICHLOROETHANE	ND	ND	ND	ND
BUTANAL	0.00568	0.00568	0.00568	0.00568
2-BUTANONE	0.00083	0.00083	0.00083	0.00083
CIS-1,2-DICHLOROETHENE	ND	ND	ND	ND
2-METHYLFURAN	ND	ND	ND	ND
ETHYLACETATE	0.00014	0.00014	0.00014	0.00014
HEXANE	ND	ND	ND	ND
CHLOROFORM	ND	ND	ND	ND
2-BUTENAL	ND	ND	ND	ND
1,2-DICHLOROETHANE	0.02500	0.02500	0.02500	0.02500
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND
N-BUTANOL	0.00257	0.00175	0.00227	0.00204
BENZENE	ND	ND	ND	ND
CARBONTETRACHLORIDE	ND	ND	ND	ND
2-PENTANONE	0.00036	ND	ND	0.00036
2-METHYLHEXANE	ND	ND	ND	ND
2,3-DIMETHYLPENTANE	ND	ND	ND	ND
PENTANAL	ND	ND	ND	0.00472
3-METHYLHEXANE	0.00086	0.00086	ND	0.00086
1,2-DICHLOROPROPANE	ND	ND	ND	ND
1,4-DIOXANE	ND	ND	ND	ND
TRICHLOROETHENE	ND	ND	ND	ND
2,5-DIMETHYLFURAN	ND	ND	ND	ND
N-HEPTANE	ND	ND	0.00036	ND
4-METHYL2-PENTANONE	ND	ND	ND	ND
CIS-1,3-DICHLOROPROPENE	ND	ND	ND	ND
2-PENTENAL	ND	ND	ND	ND
TRANS-1,3-DICHLOROPROPENE	ND	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND

CHEMICAL CONTAMINANT	T-VALUE (180-d SMAC)			
	AA04115 LAB S/N 1074 07/28/06 @ 09:55 GMT	AA04113 SM S/N 1050 07/28/06 @ 10:00 GMT	AA04114 LAB S/N 1071 08/29/06 @ 09:35 GMT	AA04112 SM S/N 1040 08/29/06 @ 09:40 GMT
TARGET COMPOUNDS (TO-14/POLAR)***				
TOLUENE	0.00042	0.00042	0.00042	0.00042
HEXANAL	0.00410	ND	0.00410	0.00410
MESITYLOXIDE	ND	ND	ND	ND
1,2-DIBROMOETHANE	ND	ND	ND	ND
BUTYLACETATE	0.00013	0.00013	0.00013	0.00013
TETRACHLOROETHENE	ND	ND	ND	ND
CHLOROBENZENE	ND	ND	ND	ND
ETHYLBENZENE	ND	ND	ND	ND
M/P-XYLENES	0.00011	0.00011	0.00011	0.00011
2-HEPTANONE	ND	ND	ND	ND
CYCLOHEXANONE	0.00042	0.00042	0.00042	0.00042
HEPTANAL	0.00357	ND	ND	ND
STYRENE	ND	ND	ND	ND
1,1,2,2-TETRACHLOROETHANE	ND	ND	ND	ND
O-XYLENE	0.00011	0.00011	0.00011	0.00011
1,3,5-TRIMETHYLBENZENE	ND	ND	ND	ND
1,2,4-TRIMETHYLBENZENE	ND	ND	ND	ND
1,3-DICHLOROBENZENE	ND	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	ND
1,2-DICHLOROBENZENE	ND	ND	ND	ND
1,2,4-TRICHLOROBENZENE	ND	ND	ND	ND
HEXAChLORO-1,3-BUTADIENE	ND	ND	ND	ND
TARGET COMPOUNDS (TOXIC)				
1,3-BUTADIENE	ND	ND	ND	ND
ETHYLENE OXIDE	ND	ND	ND	ND
CARBON DISULFIDE	0.00156	0.00156	0.00156	0.00156
2-METHYL-2-PROPENAL	0.01471	0.01471	0.01471	0.01471
3-BUTEN-2-ONE	0.05814	0.05814	0.05814	0.05814
2-ETHOXYETHANOL	ND	ND	ND	ND
DIMETHYLDISULFIDE	ND	ND	ND	ND
OCTAMETHYLCYCLOTETRASILOXANE	0.23809	0.06278	0.02599	0.06207
NON-TARGET COMPOUNDS				
OCTAFLUOROPROPANE	0.00000	0.00000	0.00000	0.00000
BROMOTRIFLUOROMETHANE	0.00000	0.00000	0.00000	0.00000
TRIMETHYLSILANOL	0.00378	0.00235	0.00789	0.00333
HEXAMETHYLCYCLOTETRASILOXANE	0.21519	0.14362	0.06496	0.18225
LIMONENE	0.00041	0.00036	0.00036	0.00044
DECAMETHYLCYCLOPENTASILOXANE	0.03153	0.01147	0.02960	0.03430
TARGET COMPOUNDS (GC)***				
CARBON MONOXIDE	0.00000	0.00000	0.00000	0.00000
METHANE	0.00195	0.00194	0.00019	0.00019
HYDROGEN	0.01858	0.01871	0.01678	0.01882
CARBON DIOXIDE	0.72428	0.73281	0.50544	0.57063
TOTAL T-VALUE	1.80647	1.17737	0.86412	1.42625

ND : Value is less than the laboratory report detection limit.

Note: Number of decimal places in T-Values do not represent significant figures of measurements.

***Measurements are calibrated by multi-point initial calibration and verified by mid-point continuing calibration.